

Attorney Docket No.: WHM 2-087

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of)
William H. Mook, Jr.)
Serial No. 10/656,710) Examiner Alan D. Diamond
Filed: September 05, 2003) Group Art Unit 1753
For: "Solar Based Electrical Energy)
Generation With Spectral Cooling")
"

COMMISSIONER OF PATENTS
P. O. BOX 1450
ALEXANDRIA, VA 22313-1450

DECLARATION UNDER 37 CFR 1.132

William H. Mook, Jr. declares as follows:

- 1) That he is a resident of the State of Ohio, having a residence address at 3909 Easton Way, Columbus, Ohio 43219;
- 2) That he is Chief Executive Officer of Moke Industries, LLC, of Columbus, Ohio, an organization dedicated to the development and fabrication of practical solar panels;
- 3) That he is the inventor named in the above-identified application for United States Patent;
- 4) That he studied as an undergraduate student with the Aerospace Engineering and Astronomy Department of The Ohio State University;
- 5) That in his senior year of such study he entered into an internship with the Federal Environmental Protection Agency in Cincinnati, Ohio developing differential equations to describe the motion of fluids, including both gases and liquids, and that he participated in the creation of a mathematical model establishing a predictive software algorithm which then was verified by making environmental data collections;
- 6) That the immense amount of data which was collected was entered into agency computers through a laboratory instrument-computer interface which he designed and constructed and which later was marketed by Digital Equipment Corporation;
- 7) That he studied as a graduate student with the Aerospace Engineering and Astronomy Department of The Ohio State University at which time he

participated in the installation of a wind tunnel and worked at a radio observatory in Delaware, Ohio under the mentoring of Dr. John D. Kraus, the observatory being referred to as "Big Ear";

- 8) That while working with Dr. Kraus he developed circuitry to carry out fast Fourier transform analysis of incoming signals from space;
- 9) That he participated in the Department of Astronomy at The Ohio State University where he was a research associate to Dr. Walter Mitchell, a solar astronomer and in conjunction with the Peak National Observatory to analyze solar spectra, collecting data from the sun and also from the Skylab satellite, the effort leading to the first detection of ringing of the solar surface through Doppler analysis;
- 10) That he developed an instrument for measuring the turbidity of liquids for the Gilson Company;
- 11) That he developed a computer-based cash register for the Bob Evans Restaurant organization;
- 12) That he created a credit card scanner for gas pumps for the Sun Oil Company and Gilbarco;
- 13) That he installed a system to automatically load super tankers with oil in Saudi Arabia;
- 14) That in 1995 he was invited and did speak to the Committee on Space Research of the United States Senate concerning space policy;
- 15) That in 1995 he was invited to speak before the Office of Science and Technology Policy of the White House with respect to forthcoming space policy legislation, his discussion concerning the commercialization of space opportunities;
- 16) That in September, 2004 he was invited to speak to the Office of Science and Technology of the White House about low cost solar energy and its impact upon a national energy policy. As a result of the latter activity some of his suggested policy adaptations were implemented by the Department of Energy in early 2005;
- 17) That he has reviewed an Office Action mailed April 11, 2005 in connection with the above-identified application for United States patent;
- 18) That he notes that at page eight of the Office Action, claims 1, 2, 4-7, 10, 21, 22, 24, 25, 27-30, 46 and 47 were rejected under §102 of the Patent Statute

as being anticipated by House, et al., U. S. Patent No. 4,082,570 (House, et al.);

- 19) That in applying the rejection the Examiner has indicated at page 9 of the Office Action that components of solar energy that are ineffective are removed, however, such removal is carried out with a dye that transmits red and absorbs blue and wherein the absorbed photons remain in the lens system to heat it up, its intimate contact with the photocell causing a heating of the photocell itself;
- 20) That at page 9 of the Office Action the Examiner observes that lens 28 directs corrected light to the cell edge illumination surface, however, lens 28 focuses to a point as opposed to providing homogenized light and thus creates hot spots resulting in ineffective performance;
- 21) That at page 10 of the Office Action with respect to claims 4, 6, 21 and 27, the Examiner has indicated that concentrating lens 28 is a dichroic since the light is divided into two parts;
- 22) That the observation of the Examiner is incorrect in that House, et al. employs a colored lens and does not reflect light away, the light being absorbed in a dispersed manner and that a dichroic filter has a very specific set of properties, one of which is that light momentum is conserved as opposed to being dispersed as taught by House, et al;
- 23) That at page 10 of the Office Action the Examiner indicates that concentrating lens 28 is a mirror due to the fact that it reflects wavelengths above about 10,000 Angstroms and that it is not a mirror, it is a dispersive filter and specifically it is a colored lens having a dye with it that disperses a range of colors and permits another set of colors to transmit;
- 24) That at page 10 of the Office Action the Examiner indicates that wavelengths in the range of about 5,000 to about 10,000 Angstroms are transmitted to the photovoltaic cell, however, the issue is to achieve bandpass efficiencies wherein inefficient heat is avoided in the system and with the instant invention ineffective colors are reflected out of the system altogether with less than a 1% dispersion loss as opposed to the inefficiencies taught by House, et al;
- 25) That at page 11 of the Office Action with respect to claims 46 and 47, the Examiner indicates that the lens 28 can contain a cyanine dye which is luminescent and that this is an incorrect observation in that cyanine is not necessarily luminescent under the conditions taught by House, et al. and

- further, House, et al. is not absorbing light and re-emitting it at a different color, it is simply transmitting light wherein transmission in the red is carried out and transmission in blue color is decreased, a condition indicating that the dye is dispersing the blue light and is not dispersing the red light;
- 26) That Hackh's Chemical Dictionary defines luminescence as emission of light at room temperature under the influence of various physical agents; as radiant;
 - 27) That by utilizing a re-emission of radiant energy otherwise ineffective photon activity may be returned to effective photon activity, a concept not suggested by House, et al;
 - 28) That House, et al. at a table at column 11 presents what is described as experimental data in a tabulation which he considers to have non-experimental data;
 - 29) That as represented in Exhibits A and B appended hereto and made part hereof, the data at column 11 at House, et al. is plotted and based upon his own laboratory research, portions of the data are manipulative and not authentic laboratory data, linear outputs being described in connection with higher and lower intensities, a result which is clearly manipulative and not based upon sound experimentation;
 - 30) That at page 11 of the of the Office Action the Examiner has rejected claims 22, 27, 29-31, 40, 41 and 45 under §102 of the Patent Statute as being anticipated by the excellent paper principally authored by Lewis and presented to the IECEC in 1997;
 - 31) That in applying this rejection the Examiner has indicated that Lewis, et al, at Fig. 3, p. 404 teaches a series-connected array of photovoltaic cells;
 - 32) That the Examiner misconstrues Lewis, et al, in that the paper describes a purpose of voltage matching and not a purpose of series connected photocells so configured to reduce total current as taught by the instant invention;
 - 33) That Lewis, et al. recognizes that it is necessary to match current or voltage or load and the determination made by the Lewis, et al. investigators was to match voltage to the extent that Ms. Lewis is taking different voltage levels and placing the appropriate number of cells in series to achieve a match;
 - 34) That a series connected system as described at page 404 of Lewis, et al. is not for the purpose of operating at high radiation intensities but for the

purpose of connecting together a variety of different photocell materials as efficiently as possible, it being apparent the Examiner is confusing bandgap based efficiencies with a series junction device wherein a large number of photodiodes may be coupled in series but exhibit the same bandgap characteristics;

- 35) That at pages 11 and 12 of the Office Action the Examiner indicates that a parabolic Fresnel lens concentrator is described in Lewis, et al;
- 36) That the instant invention teaches the utilization of a Fresnel mirror and not a Fresnel lens wherein a lens is combined with a dichroic mirror to derive a Fresnel concentrator, Lewis, et al. describing simply a Fresnel lens concentrator;
- 37) That with respect to the commentary of the Examiner concerning claim 27 on page 12 of the Office Action, he observes that Lewis, et al. is employing an imaging system incorporating a collimator whereas the instant invention is one teaching the use of homogenized light as it impinges upon a photovoltaic cell;
- 38) That at page 12 of the Office Action the Examiner's commentary with respect to claims 29 and 30 is that the dichroic beam splitters impinge light at a substantially uniform intensity, and that this observation is incorrect, inter alia, because Lewis, et al. at page 404 observe that one of the loss mechanisms is non-uniform illumination over the cell planes and he further observes that a dichroic device cannot homogenize light;
- 39) That at page 12 of the Office Action with respect to claim 31, the Examiner indicates that prisms providing minimal reflective losses can be used as described at page 404 in Lewis, et al.
- 40) That the prism described in Lewis, et al. is an imaging system which cannot homogenize light and that while prisms can be designed to homogenize light, such structuring is not suggested in Lewis, et al.
- 41) That one of the salient aspects of the Lewis, et al. paper is the reference at page 402 to the studies of Bekey and Blocker in 1978 representing an attempt to create a system similar to the one he has now successfully developed;
- 42) That he discussed the Lewis, et al. paper with Ms. Lewis in April 2,005 and that she indicated that these systems are impractical because of the losses involved in the multiple steps which are necessitated;

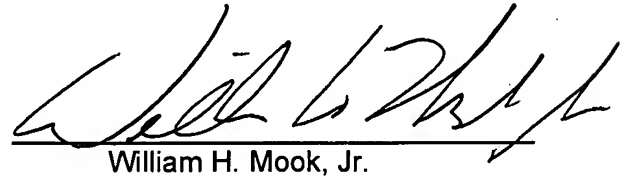
- 43) That she had hoped to achieve some success because of the advances in dichroic devices and unfortunately, the demonstration hardware which subsequently was developed did not work as expected;
- 44) That at page 13 of the Office Action in commenting about claims 41 and 45 the Examiner indicates that the dichroic beam splitters of Lewis, et al. read upon the primary concentrator components and each of the transparent mirrors;
- 45) That the claims therein discussed are concerned with a combination of a dichroic mirror with a Fresnel lens to derive a primary concentrator, a combination not suggested at Lewis, et al;
- 46) That this combination avoids steps in the system and accordingly avoids a loss mechanism;
- 47) That he notes that at page 13 of the Office Action claims 1-7, 10, 21, 22, 24-30, 46 and 47 have been rejected under §103 of the Patent Statute as being unpatentable over House, et al;
- 48) That at page 15 with respect to claims 4, 6, 21 and 27 the Examiner states that the concentrating lens 28 is dichroic since the light is divided into two parts;
- 49) That House, et al. clearly states that plano convex lens 28 has dyes in it;
- 50) That dyes function to disperse light which is absorbed and not reflected out of the system;
- 51) That the lens described at 28 in House, et al. is a colored plastic lens and not a dichroic device;
- 52) That at page 16 of the Office Action with respect to claim 7, 29 and 30, the Examiner indicated a position that House, et al. lens 28 provides substantially uniform intensity of the impinging light;
- 53) That House, et al. clearly describes an imaging system which cannot homogenize light and cannot provide even illumination across the receiving surface of a photovoltaic cell;
- 54) That at page 16 of the Office Action with respect to claims 3 and 26, the Examiner observes that House, et al. does not specifically recite an angle generally equivalent to Brewster's angle and that he submits that Brewster's angle provides 100% transmission between one refractive mechanism and another;

- 55) That the utilization of Brewster's angle as taught by the instant application is one which may operate in the system in lieu of anti-reflective coatings which incur losses;
- 56) That at page 20 of the Office Action, Lewis, et al. is combined with Penn, U. S. Patent No. 6,469,241 (Penn) and Clark, U. S. Patent No. 4,350,837 (Clark).
- 57) That each of the secondary references are imaging systems and do not utilize homogenization and non-imaging components as taught by his invention;
- 58) That the approach of Clark is specifically criticized in the Lewis, et al. paper at page 404 in the second column wherein the comment is made that there is concern that it would be difficult to sufficiently avoid spectral order overlap with a practicable prism system. The prism-based optics also appear to be relatively massive, significant mass reduction will be required for it to be a viable option;
- 59) At page 20 of the Office Action the Examiner applies Winston, U. S. Patent No. 3,923,381 and at page 21 indicates that Winston teaches an inwardly depending logarithmic defined sloping surface;
- 60) That the drawings in Winston are essentially the same as in the Winston text on non-imaging optics;
- 61) That the Winston text describes the figures shown in the patent as compound parabolic concentrators and not logarithmic devices;
- 62) That at page 21 of the Office Action the Examiner has rejected claim 38, citing Bell, U. S. Patent No. 4,115,149 (Bell);
- 63) That Bell utilizes a spherical concentrator employing a coma image in such a way as to cause an uneven illumination at the receiving surface of a photocell;
- 64) Bell creates an image of the sun and there is no coma corrector as set forth in the subject claim;
- 65) That the rejections applied under §103 of the Patent Statute essentially repeat the rejection applied under §102 of the Patent Statute and the commentary set forth with respect to the latter are appropriate to former;
- 66) That all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false

statements and the like, so made, are punishable by fine, or imprisonment, or both, under §101 of Title 18, and that such willful false statements may jeopardize the validity of the application or any document resulting therefrom.

Further Declarant sayeth naught.

Date June 16, 2005


William H. Mook, Jr.